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10/705,604	11/10/2003	Shunpei Yamazaki	0553-0381	6065

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COOK, ALEX, MCFARRON, MANZO,
CUMMINGS & MEHLER, LTD.
Suite 2850
200 West Adams St.
Chicago, IL 60606

EXAMINER	
LIN, JAMES	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/705,604	YAMAZAKI ET AL.	
	Examiner	Art Unit	
	Jimmy Lin	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *4,5,8,9,12,13,18,19 and 29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6,7,10,11,14-17 and 20-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/27/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/27/2007 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3, 6-7, and 22-28 recite the limitation "from the below". There is insufficient antecedent basis for this limitation in the claim. For the purpose of this examination, the limitation will be interpreted to having the ejection occur below any structure.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3, 6-7, and 24-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Miyazawa (U.S. Publication No. 2003/0166311).

Miyazawa discloses a method of making an EL element. The EL material can be ejected onto a pixel electrode 141 under a high vacuum ([0090]-[0093]; Fig. 5). The vacuum must necessarily be contained in some sort of chamber, and the ejection must necessarily occur below the upper surface of the chamber.

Claim 3: Miyazawa does not explicitly teach volatilizing the solvent in solution in a duration before the solution arrives at the electrode. However, the Applicant's specification seems to suggest that the vacuum causes the volatilizing of the solvent (see, e.g., pg. 11, lines 2-10 of present specification). Since the EL solution of Miyazawa is ejected into a vacuum, the solvent from the EL solution must necessarily volatilize before the solution arrives at the electrode.

Claims 6-7: The pixel electrode can be set up 0° relative to the horizontal plane (Fig. 1).

Claims 24-26: The ejection can occur intermittently through a nozzle [0020].

Claims 27-28: The EL material can be form a luminescent layer, electron transport layer, or a hole transport layer [0093].

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311.

Miyazawa does not explicitly teach ejecting under a pressure in a range of 10^2 Pa to 10^5 Pa, but does exemplify vacuum pressures of less than 0.133322 Pa [0092]. However, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical (MPEP 2144.05.II.A.). This decision is clearly analogous to pressure differences and other process parameters. Miyazawa teaches that the pressure of the vacuum deposition chamber is adequately less that in the nozzle, such that the ejected material is vaporized [0010]. One of ordinary skill would have recognized that any degree of vacuum that is less than the pressure in the nozzle would have been operable. Therefore, it would have been obvious to one of ordinary

skill in the art at the time of invention to have used any degree of vacuum, including those in the claimed range, when ejecting the EL material of Miyazawa with a reasonable expectation of success because one of ordinary skill in the art would have used any chamber pressure that is less than the pressure in the nozzle.

8. Claims 1-3, 6-7, and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (U.S. Publication No. 2002/0075422, as provided by Applicant) in view of Kawase (GB 2,360,489) and McCormick et al. (U.S. Patent No. 6,593,690).

Kimura teaches a method of making an electroluminescent (EL) display device [0122]. In the embodiment of Fig. 8, an EL solution 114A is ejected towards the pixel electrode 141, wherein the pixel electrode is turned to face downward [0170].

Kimura teaches the need to form a uniform EL layer [0160], but does not explicitly teach ejecting under a pressure lower than atmosphere pressure.

Kawase teaches the problem of nucleation of EL droplets deposited via an ink jet method. After the deposition of the EL droplets, the edges of the deposited material dry faster while the center of the droplet has a high vapor concentration which inhibits drying, thus resulting in a droplet with a higher concentration of the EL material on the outer edge and less at the center. Such a result would produce a non-uniform EL layer (2nd full paragraph on pg. 8 and paragraph bridging pg. 8-9). This problem can be avoided by increasing the drying speed of the deposited material (1st full paragraph on pg. 9). Kawase teaches that a flow of gas across the substrate and heating of the substrate during deposition can increase the drying speed, but does not explicitly teach the use of a vacuum.

McCormick teaches that applying a vacuum is an operable equivalent of applying heat in the method of increasing drying speed (col. 6, lines 47-51). The teachings of McCormick would have presented a recognition of equivalency in the prior art and would have presented strong evidence of obviousness in substituting one method for the other in a process of evaporating a solvent. The substitution of equivalents requires no express suggestion. See MPEP 2144.06.II.

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided a vacuum during the ejection of the EL solution of Kimura with a reasonable expectation of success because Kawase teaches the need to increase the drying speed during

ejection in order to form a uniform EL layer and McCormick teaches that drying of EL solution can be accomplished via a vacuum atmosphere. One would have been motivated to do so in order to have formed a more uniform EL layer. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Claims 2,22-23: McCormick does not explicitly teach a vacuum pressure in the claimed range. However, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical (MPEP 2144.05.II.A.). This decision is clearly analogous to pressure differences and other process parameters. It would have been obvious to one of ordinary skill in the art at the time of invention to have used any vacuum pressure, including those in the claimed range, that causes the evaporation of solvent.

Claim 3: Kimura, Kawase, and McCormick do not explicitly teach volatilizing the solvent in solution in a duration before the solution arrives at the electrode. However, the Applicant's specification seems to suggest that the vacuum causes the volatilizing of the solvent (see, e.g., pg. 11, lines 2-10 of present specification). Since the EL solution of Kimura is ejected into a vacuum, the solvent from the EL solution must necessarily volatilize before the solution arrives at the electrode.

Claims 6-7: Kimura teaches that the substrate can be 0° relative to the horizontal plane (Fig. 8).

Claims 24-26: Kimura teaches that the EL composition is continuously intermittently deposited through a nozzle to form a thin film ([0136]; Fig. 8).

Claim 27-28: Kimura teaches that the EL composition can be a hole injection material [0171].

9. Claims 1-3, 6-7, and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa (U.S. Publication No. 2003/0166311) in view of Kimura '422.

Miyazawa discloses a method of making an EL element. The EL material can be ejected onto a pixel electrode 141 under a high vacuum ([0090]-[0093]; Fig. 5).

Miyazawa does not explicitly teach that the EL material is ejected from below. However, Kimura teaches that it was well known in the EL art to eject a solution towards a pixel electrode that is turned to face downward ([0170]; Fig. 8). It would have been obvious to one of ordinary skill in the art at the time of invention to have ejected the EL material of Miyazawa with the pixel electrode facing downwards with a reasonable expectation of success because Kimura teaches that such an ejection method was operable in the art.

Claims 2,22-23: Miyazawa does not explicitly teach ejecting under a pressure in a range of 10^2 Pa to 10^5 Pa, but does exemplify vacuum pressures of less than 0.133322 Pa [0092]. However, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical (MPEP 2144.05.II.A.). This decision is clearly analogous to pressure differences and other process parameters. Miyazawa teaches that the pressure of the vacuum deposition chamber is adequately less that in the nozzle, such that the ejected material is vaporized [0010]. One of ordinary skill would have recognized that any degree of vacuum that is less than the pressure in the nozzle would have been operable. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used any degree of vacuum, including those in the claimed range, when ejecting the EL material of Miyazawa with a reasonable expectation of success because one of ordinary skill in the art would have used any chamber pressure that is less than the pressure in the nozzle.

Claim 3: Miyazawa teaches that the EL material can be in solution with a solvent, but does not explicitly teach volatizing a solvent in the solution in a duration before the solution arrives at the electrode. However, such must necessarily occur, as discussed above.

Claims 6-7: Kimura teaches that the substrate can be 0° relative to the horizontal plane (Fig. 8).

Claims 24-26: Miyazawa teaches that the EL composition is continuously intermittently deposited through a nozzle to form a thin film [0140].

Claim 27-28: Miyazawa teaches that the EL composition is a luminescent material [0140].

10. Claims 10-11 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489 and McCormick '690 as applied above, and further in view of Miyashita et al. (U.S. Publication No. 2002/0155215).

Kimura, Kawase, and McCormick are discussed above. Kimura teaches a pixel electrode 141 and a top electrode 154 (Fig. 5), but does not explicitly teach which of the electrodes is a cathode and which is an anode.

Miyashita teaches an EL configuration wherein the top electrode 113 is a cathode [0060]. The pixel electrode 101 must necessarily be an anode (Fig. 1). Because Miyashita teaches that such configurations of a cathode and an anode are operable for an EL device, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed an anode as the pixel electrode and a cathode as the top electrode in the EL device of Kimura with a reasonable expectation of success. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Kimura does not explicitly teach that the cathode is formed via a sputter or evaporation method. However, Miyashita teaches that it was well known for the cathode to be formed via sputtering [0060]. It would have been obvious to one of ordinary skill in the art at the time of invention to have formed the cathode of Kimura using a sputtering method with a reasonable expectation of success because Miyashita teaches that such methods of forming a cathode are well known in the art. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Claims 22-28 are rejected for substantially the same reasons as discussed above.

11. Claims 10-11 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Kimura '422 as applied above, and further in view of Miyashita '215.

Miyazawa and Kimura are discussed above. Miyazawa teaches that there is no limitation on whether the bottom electrode is to be the anode or cathode and that the electrodes can be formed by any conventional method [0162].

Miyazawa does not explicitly teach that the bottom electrode 141 is an anode and that the top electrode is a cathode formed via sputtering or evaporation. However, such is obvious over Miyashita for substantially the same reasons as discussed immediately above.

Claims 22-28 are rejected for substantially the same reasons as discussed above.

12. Claims 16-17 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489 and McCormick '690 as applied above, and further in view of Yamazaki (U.S. Publication No. 2002/0164416).

Kimura, Kawase, and McCormick are discussed above. Kimura teaches a pixel electrode 141 and a top electrode 154 (Fig. 5), but does not explicitly teach which of the electrodes is a cathode and which is an anode.

Yamazaki teaches an EL configuration wherein the pixel electrode 106,107 is the cathode and the top electrode 109 is the anode ([0037],[0040]; Fig. 1). Because Yamazaki teaches that such configurations are operable for an EL device, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed the pixel electrode as the cathode and the top electrode as the anode in the EL device of Kimura with a reasonable expectation of success. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Kimura does not explicitly teach that the anode is formed via a sputter or evaporation method. However, Yamazaki teaches that it was well known to form the anode over the EL layer via sputtering [0040]. It would have been obvious to one of ordinary skill in the art at the time of invention to have sputtered the anode onto the EL device of Kimura with a reasonable expectation of success because Yamazaki teaches that such methods of forming an anode are well known in the art.

Claims 22-28 are rejected for substantially the same reasons as discussed above.

13. Claims 16-17 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Kimura '422 as applied above, and further in view of Yamazaki '416.

Miyazawa and Kimura are discussed above. Miyazawa teaches that there is no limitation on whether the bottom electrode is to be the anode or cathode and that the electrodes can be formed by any conventional method [0162].

Miyazawa does not explicitly teach that the bottom electrode 141 is the cathode and that the top electrode is an anode formed via sputtering or evaporation. However, such is obvious over Yamazaki for substantially the same reasons as discussed immediately above.

Claims 22-28 are rejected for substantially the same reasons as discussed above.

14. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489, McCormick '690, and Miyashita '215 as applied to claims 10-11 above, and further in view of Konuma et al. (U.S. Publication No. 20020030443).

Kimura, Kawase, and McCormick as discussed above, but do not explicitly teach that the formation of the EL layer and the cathode is performed in a multi-chamber scheme or an in-line scheme without a release to air.

Konuma teaches that EL material is extremely weak against oxidation and the slightest amount of moisture can easily accelerate the oxidation to degrade the EL material [0013]. There is a need to use an apparatus to control the environment during deposition such that the EL layers are not exposed to moisture and oxygen in the air [0021]. Konuma teaches the use of a multi-chamber scheme (Figs. 1-3) and an in-line scheme (Figs. 4A-4B). Because Kimura teaches the need for a high-quality display device, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed the EL layers and the cathode of Kimura in either a multi-chamber or an in-line chamber of Konuma with a reasonable expectation of success. One would have been motivated to do so in order to have prevented degradation of the EL layer and to have manufactured a higher quality EL display.

15. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Kimura '422 and Miyashita '215 as applied to claims 10-11 above, and further in view of Konuma '443.

Miyazawa and Kimura are discussed above, but do not explicitly teach that the formation of the EL layer and the cathode is performed in a multi-chamber scheme or an in-line scheme without release to air.

Miyazawa does teach the need for improving the quality of the EL display [0056]. Konuma teaches that the use of a multi-chamber or in-line deposition apparatus is obvious for substantially the same reasons as discussed immediately above.

16. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489, McCormick '690, and Yamazaki '416 as applied to claim 16-17 above, and further in view of Konuma for substantially the same reasons as discussed above.

17. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Kimura '422 and Yamazaki '416 as applied to claim 16-17 above, and further in view of Konuma for substantially the same reasons as discussed above.

Response to Arguments

18. Applicant's arguments filed 11/27/2007 have been fully considered but they are not persuasive.

Applicant argues on pg. 5 that Morii clearly discloses ejecting the ink first, and then putting the substrate into a decompression device to put the deposited substrate under reduced pressure and that the combination of Kawase and Morii would still involve depositing the solution first and then placing the solution under vacuum. However, Morii was used to teach that other methods of drying a solvent was well known in the art. The rejection was based on the substitution of the drying process of Kawase for the drying process of Morii. Nevertheless, the teachings of Morii has been replaced with the teachings of McCormick to show that it was well known in the art that increased drying speeds can be achieved by applying either heat or a vacuum. The teachings of McCormick would have reasonably suggested the equivalency of the two methods of drying. The substitution of equivalents requires no express suggestion. See MPEP 2144.06.II. Therefore, it would have been obvious to have substituted the drying step of

Kawase with the drying step of McCormick. Kawase teaches that the drying step can be applied during the deposition step. See above discussion for details.

19. Applicant's arguments, see pg. 5-6, filed 11/27/2007, with respect to the rejection(s) of claim(s) 1-3, 6-7, and 22-28 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Miyazawa and Kimura.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Lin whose telephone number is (571)272-8902. The examiner can normally be reached on Monday thru Friday 8AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jimmy Lin/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792